S.S. "Chester Sun" Phl 2720
Profile & Deck Plans
Sun S B Co. No. 1.

Elwood

RETAIN

W409-0189

Scantlings of Transverse Framing Fitted in Fore Peak
Frames 7" x 3½" x .40 Reverses 3" x 3½" x .40 Forming a 7" Girder
F'cle Dk Beams 7" x 3 3/16" x 20.9# [Brackets 25" x .46
Upper " " " "
Main " " 10" x 3⅜" x 21.8# " " 28" x .50
Alternate Reverses Carried to F'cle Dk
Sketch Showing Transverse Frames Aft of Collision Bhd.
Upper Dk
Double Clips
Forecastle Dk
Transverse Frames Fore Extent as Shown
Transverse Framing Keel to F'cle Dk
Brackets at ℄ and at Trunk Sides
Bridge Front .46" Coaming .50"
Stiffeners 10" x 37.2# [Bracketed Top & Bottom. Spaced 43"
Bridge Side Plating Carried Down to Deck at Bridge Ends
Sheerstrake 1.02 at Bridge Ends
Chart & Wheel House
Captains House
Saloon House
Bridge Dk
Bridge End .30"
Stiffeners 3½" x 3 x 6.7#
Bulwark Plating Increased to .50" at Poop Front & Bridge Ends.
Poop Front .46" Coaming .50"
Stiffeners 10" x 32.2# [Spaced 43"
Bracketed Top & Bottom.
Poop Side Plating Carried Down to Deck at Poop Front.
Sheerstrake 1.02 at Poop Front.
Poop Dk
Galley
Engine Casing
Boiler Casing
No 1 Tank
No 2 Tank
No 3 Tank
No 4 Tank
No 5 Tank
Pump Room
No 6 Tank
No 7 Tank
No 8 Tank
No 9 Tank
Cargo
Fore Peak Tank
See Separate Plan for Transverses in Engine & Boiler Space
See Separate Plan for Transverses in Fore Hold & Peak
Upper Dk
Main Dk
Oil Tight Trunk Below
Hatch
No 1 Summer Tank
No 2 Summer Tank
No 3 Summer Tank
No 4 Summer Tank
No 5 Summer Tank
No 6 Summer Tank
Deck Plating .40
Stringer .44
Trunk (Port Side Only)
Stringer .37 - .36
Deck .36
Coal
Hatch
Galley
Engine Casing
Boiler Casing
Poop Dk
Detail of Web Connection at Upper Dk Hatches
Scale 1½" = 1 FT.
Upper Dk
6" x 6" x 17.2# Double
7/8" Rivets
15" x .40"
Stringer .45 x .42
Deck .32
Bridge Dk
Principal Dimensions
430-0 B.P. x 59-0" x 33-3 Mld
Isherwood System (Patent)
Stringer .36
Deck .34
Thick Plate under Windlass
F'cle Dk

FOR CONTRACTS
NOS. 1 & 2

SUN SHIPBUILDING CO.
CHESTER, PA.
..BLUE PRINT ROOM..
Print No. 38
Made JUL 20 1917
For Dept. Lloyds

Note: Plan amended to embody
Lloyds requirements.
23 Ag. 1916

Alterations				Alterations			
No.	Date	Description	Approved	No.	Date		Approved.
6	26 Ja. 17	Sizes of cargo hatches on upper & main Dk. frs. #50 & 51 & coal hatch on Poop Dk frs. 19-21 changed		1	26 Aug 16	Cant frames & screen Bhead modified.	A.E.S.
				2	1 Sept	Length to collision Bhd altered was 24.4	[illegible]
				3		Trunk to pump room; hatches to cold storage; and hatch to cofferdam Fr. 20-21 relocated	A.E.S.
				4	12 Oct. 16	Dynamo flat extended to 18 Fr	
				5	17 Oct. 16	Donkey boiler flat reduced	

Sun Shipbuilding Co
Chester. Pa.
Profile
and Deck Plans
Scale ⅛" = 1 Ft.
Dg. 1-7000-A
Date. 10 Aug 16 A.E.S. Naval Architect

W409-0189
Lloyd's Register Foundation

W409 - 0193

"Elwood".
ex
S.S. "Chester Sun" Phl 2/20
Midships Section.
Sun SB Co's No 1.

RETAIN

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Lloyd's Register Foundation

Sun S B Co Ld

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Lloyd's Register Foundation

Extra Plan Midship Section & Profile
Tan No. 1 & 2

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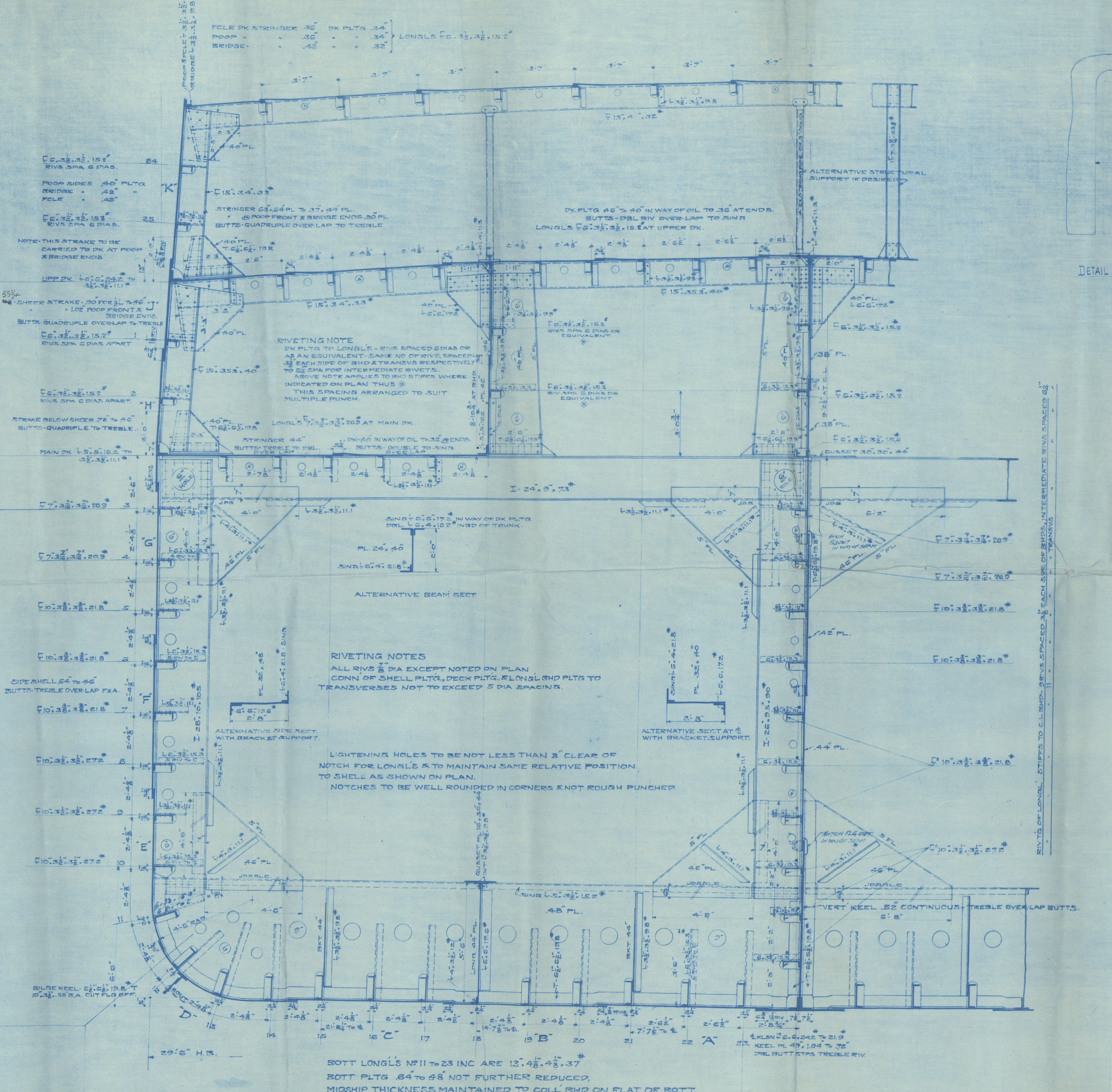
Lloyd's Register Foundation

ALTERATIONS

#1. LONGL BKT CONNS TO BHDS BELOW MAIN DK IN WAY OF SHELL ONLY CHANGED TO TEE CLIP TYPE.

#2 BKTS @ LONG'S #3 TO #12 INCL IN WAY OF ℄ BHD ON SIDE OPP TO STIFFENER TO HAVE 6½" TEE CONN IN PLACE OF ∠.

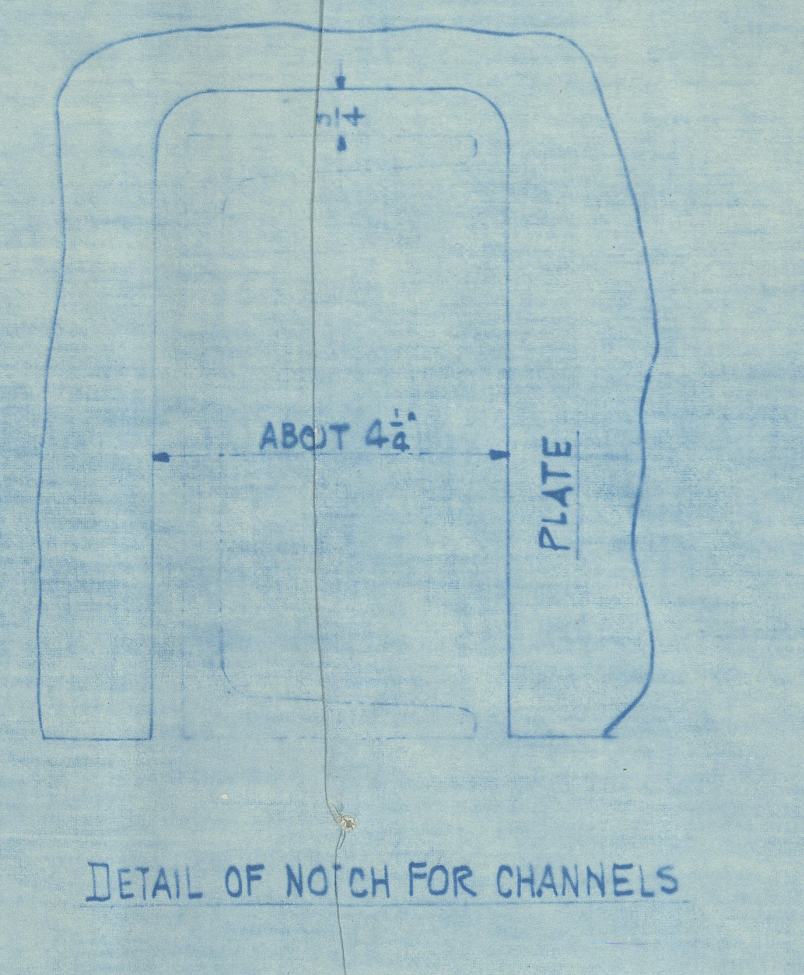

ALTERNATIVE BEAM SECT.
ALTERNATIVE SIDE SECT. WITH BRACKET SUPPORT.
ALTERNATIVE SECT AT ℄ WITH BRACKET SUPPORT.
"A"
"B"
"C"
"D"
H.B.
℄ KLSN ∠ 6.6.24.2 TO 21.9#
KEEL PL 49". 1.04" TO .72"
DBL BUTT STPS TREBLE RIV.

RIVETING NOTES
ALL RIVS 7/8" DIA EXCEPT NOTED ON PLAN
CONN OF SHELL PLTG., DECK PLTG., & LONGL BHD PLTG TO TRANSVERSES NOT TO EXCEED 5 DIA SPACING.

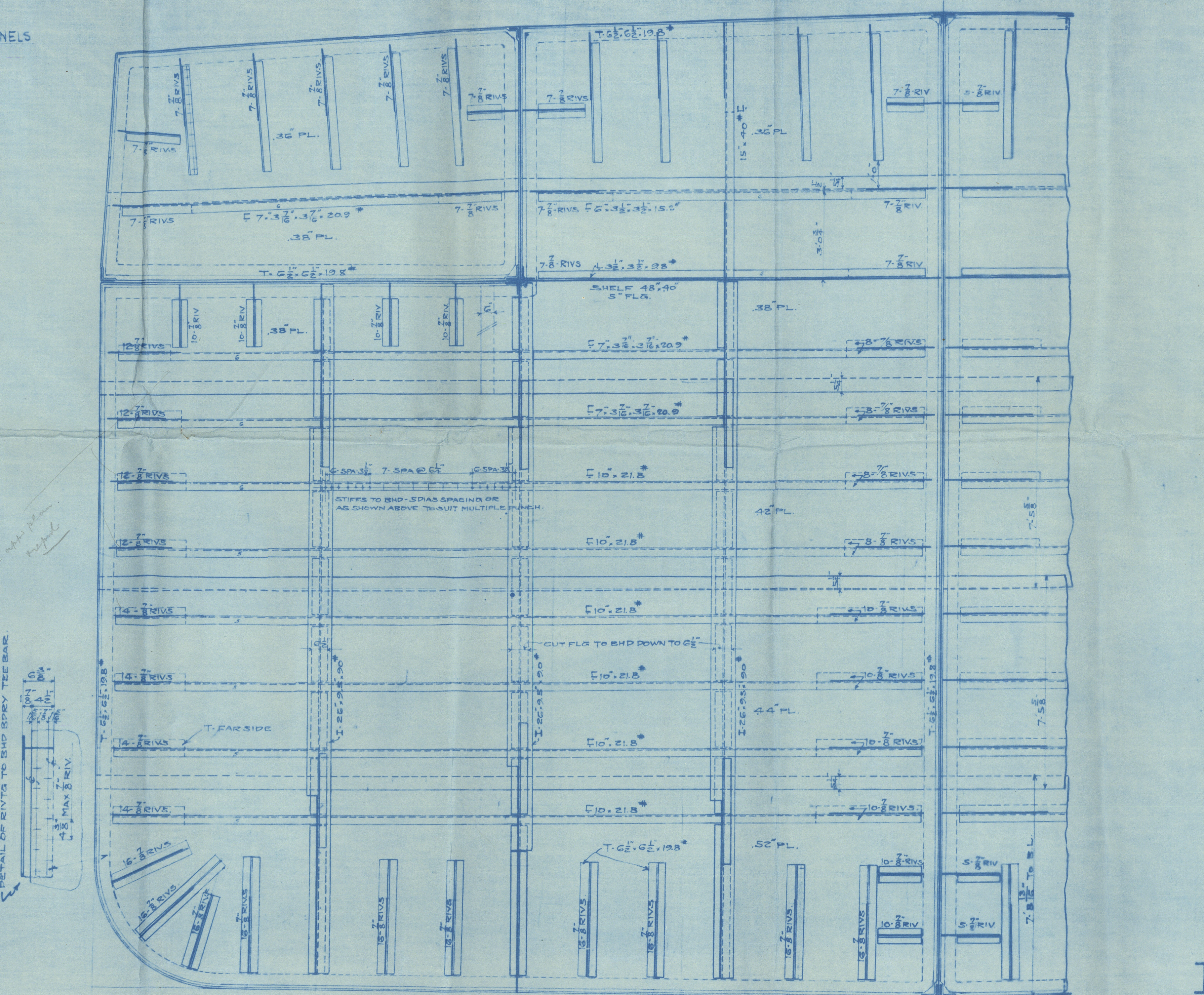
LIGHTENING HOLES TO BE NOT LESS THAN 8" CLEAR OF NOTCH FOR LONGL'S & TO MAINTAIN SAME RELATIVE POSITION TO SHELL AS SHOWN ON PLAN.
NOTCHES TO BE WELL ROUNDED IN CORNERS & NOT ROUGH PUNCHED.

BOTT LONGL'S Nº 11 TO 23 INC ARE 13". 4⅛". 4⅛". 37#
BOTT PLTG .64" TO .48" NOT FURTHER REDUCED,
MIDSHIP THICKNESS MAINTAINED TO COLL BHD ON FLAT OF BOTT.
BUTTS-QUADRUPLE OVER-LAPPED FOR ½L TO TREBLE AT ENDS.
SEAMS-DBL RIVETED.

LONGL'S TO SHELL { 11 RIVS SPACED 3⅛" EACH SIDE OF BHDS, INTERMEDIATE RIVS SPACED 6¼"
13 " " " " " TRANSV'S, " " " "


ARGIT 44"
PLATE

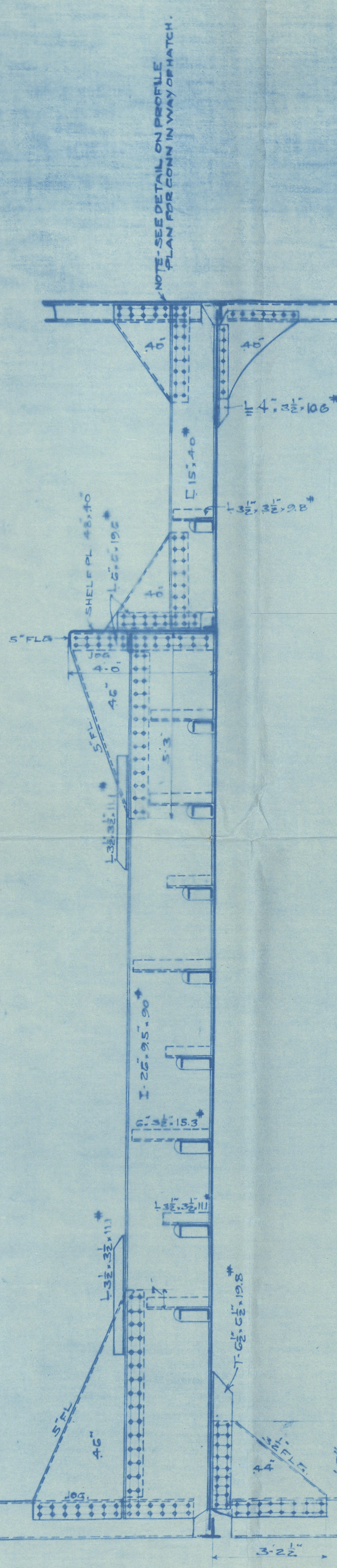
DETAIL OF NOTCH FOR CHANNELS



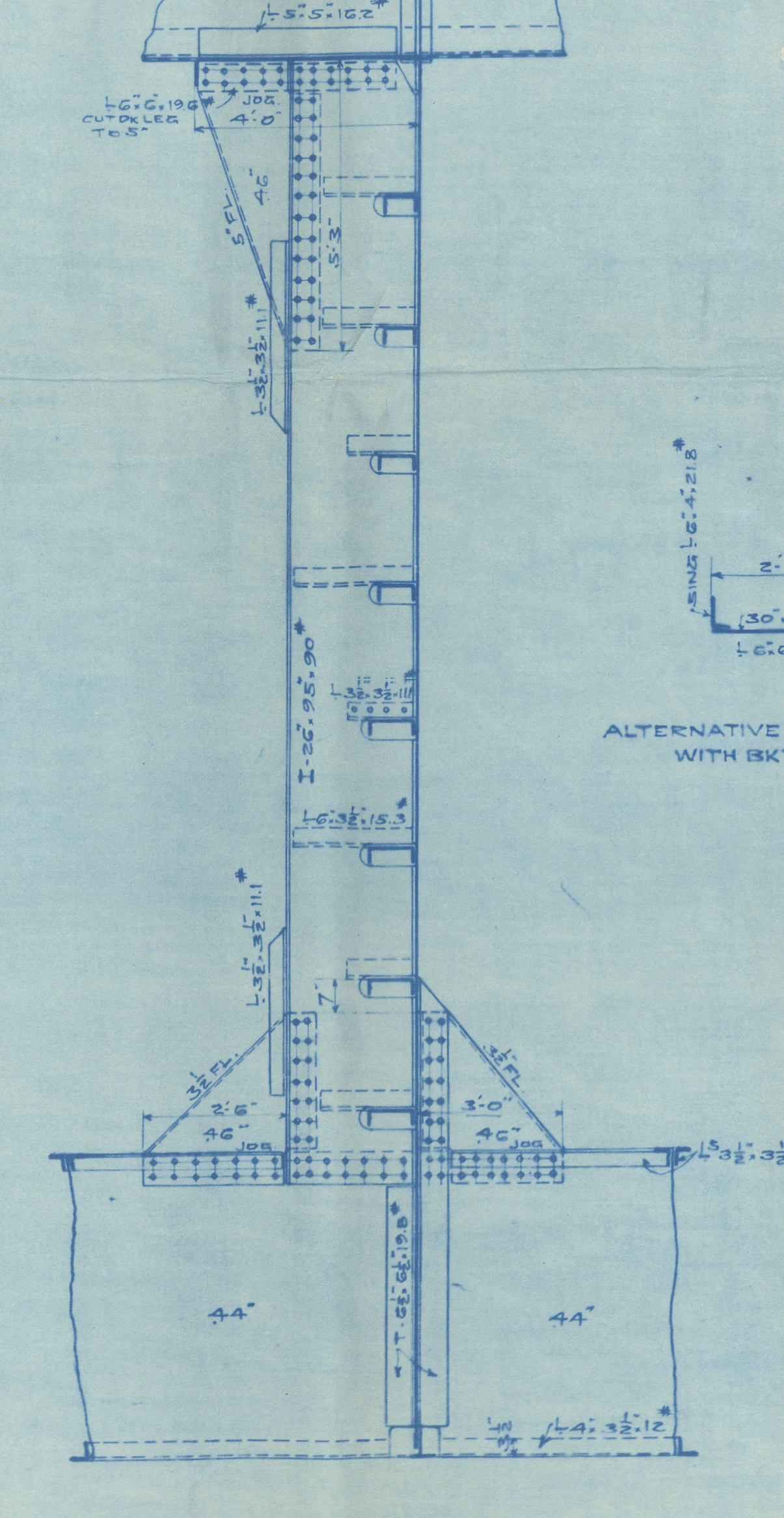
TYPICAL DETAIL OF O.T. BHD.

BKT PL NOTES:
BKT PLS AT BOTTOM, AT BILGE, AND ALL TAKING 10 RIVS OR MORE TO HAVE INNER EDGE FLANGED.
RIVETS IN BKT PLS TO BE SPACED NOT LESS THAN 3⅛".
ALL LONGL BKT PLS TO BE .44" THICK BELOW MAIN DK.
ALL LONGL BKT PLS TO BE .40" THICK ABOVE MAIN DK.

RIVETING NOTES:
ALL RIVS TO BE 7/8" DIA.
BHD BDRY BARS TO PLTG 5 DIA SPACING
HORIZONTAL STIFFS TO PLTG AS NOTED ON PLAN.
VERT WEB STIFFS TO PLTG 5 DIA SPACING.
SEAMS & BUTTS 3½ DIA SPACING.

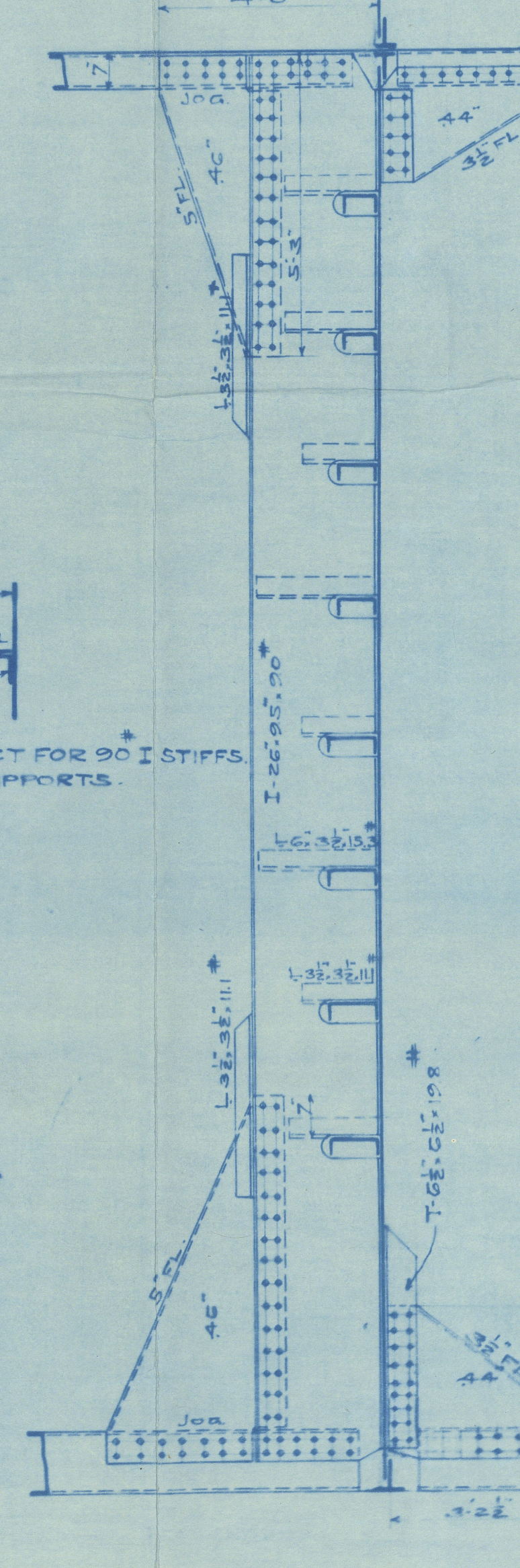

I-26". 9.5". 90#
∠ 3½". 3½". 11.1#
∠ 6. 3½". 15.3
T-6½". 6½". 19.8#
5" FL
3½" FLG.
46"
44"
JOG.
3'-8"
3'-2½"

DETAIL OF INB'D VERT STIFF.

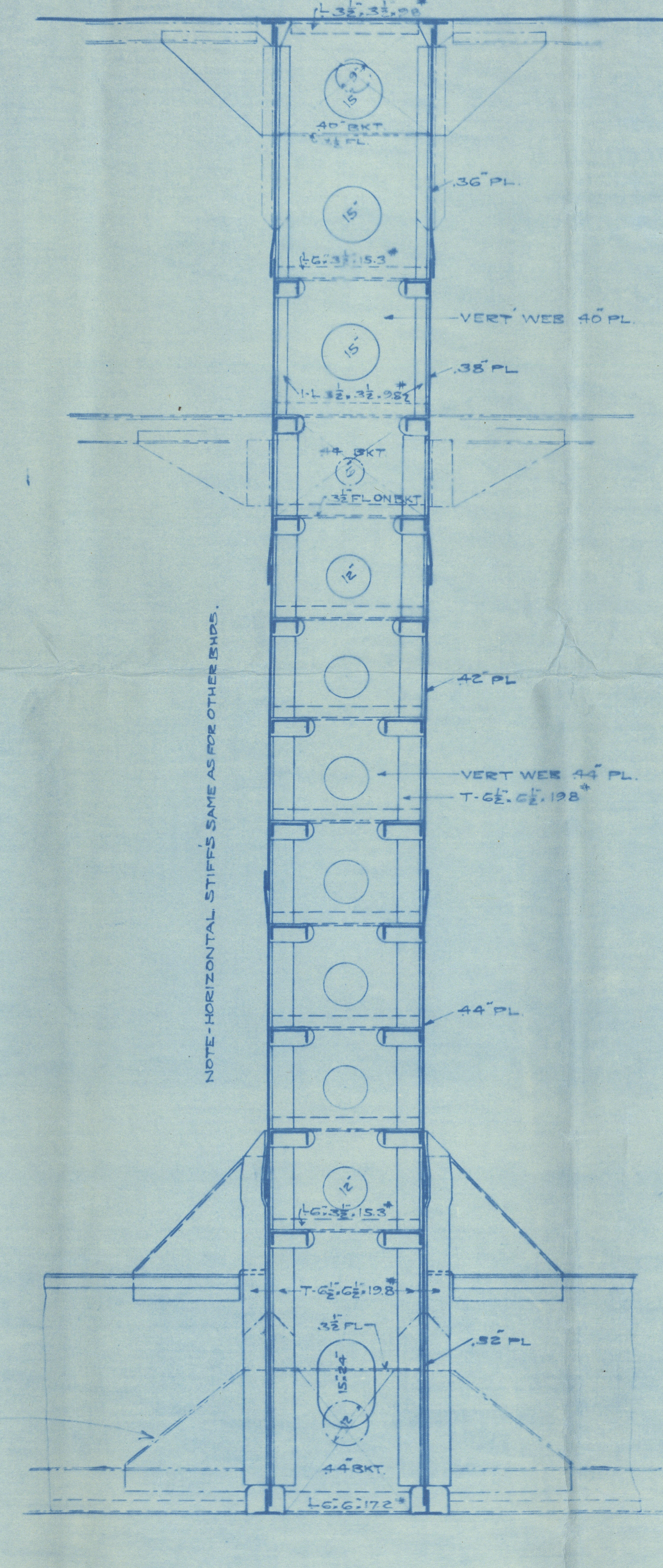

EXPANSION TRUNK
I-26". 9.5". 90#
∠ 6. 3½". 15.3
T-6½". 6½". 19.8#
∠ 4". 3½". 12#
3½" FL
2'-6"
3'-0"
46"
44"
JOG

DETAIL OF VERT STIFF AT EXP TRUNK BHD.

ALTERNATIVE SECT FOR 9" ⊏ STIFFS WITH BKT SUPPORTS.



DETAIL OF OUTB'D VERT STIFF.


VERT WEB .44" PL
T-6½". 6½". 19.8#
.44" BKT.
∠ 6. 6. 17.2#

TYPICAL DETAIL FOR COFFERDAM BHD.
NOTE- THREE DIAPHRAGMS EACH SIDE.

EQUIPMENT Nº 41339

2 - BOWER	ANCHORS		STOCKLESS	8100	LBS.
1 -	"		"	7000	"
1 - STREAM	"		"	2870	"
1 - KEDGE	"		"	1260	"
300	FATHOMS	2⅜"	STUD CHAIN CABLE.		
120	"	5"	CIRC STEEL WIRE HAWSER.		
130	"	5½"	" " " TOWLINE.		
400	"	8"	" MANILA HAWSERS & WARPS		

RUDDER STOCK 11½" DIA.
" PLATE 1.12"
" POST 9" x 8½"
PROPELLER POST 10½" x 8½"
STEM 10½" x 2⅞"
} PLAN TO BE SUBMITTED.

TOTAL RUDDER AREA ABAFT ℄ OF PINTLES = 179 ◻' C.G = 4'-0"
A x D = 716.
SPEED OF VESSEL IN KNOTS PER HOUR = 10.5

BULK OIL STEAMER
LENGTH B.P. 430'-0" BREADTH 59'-0" DEPTH MLD 33'-3"
TRANS Nº 92.25 LONGL Nº 39694 L/D UPPER DK 12.94
"ISHERWOOD SYSTEM" (PATENT)

FOR CONTRACTS NOS. 1 & 2

SUN SHIPBUILDING CO.
CHESTER, PA.
BLUE PRINT ROOM.
Print No. 35
Made JUL 20 1917
For Dept. LLOYDS

24 78 1
27 JA-17
25 78
13-F-17
26 [illegible]
6-MR-17
27 74
24-MR-17
28 36
MAR 17
29 [illegible] 1
30 AP-17
30 32 45 3
17 MY 17

BLUE PRINTS		
PT. No	DEPT	No PTS
[illegible]	[illegible]	[illegible]

NOTE
PLAN AMENDED TO EMBODY LLOYDS REQUIREMENTS
23-AUG-16

MIDSHIP SECTION
and
BULKHEAD TYPE PLAN
SUN SHIPBUILDING Co
CHESTER PA.

SCALE ½" = 1 FT. DRAWN BY [illegible] DATE [illegible] 16
APPROVED [illegible] DR [illegible] 720B-A

W409-0193

3. S. E. Scotch Boilers
made by
New York S B Co
for
Chester S B C.
Hull 350.

Copy of plan approved. 20-4-16.

No 119
LLOYDS TEST
240 LBS
28-7-14. A.T.T.

Phila. Rpt. No. 2720.
Ellwood.
ex
s/s Chester Sun

RETAIN

W409-0192

FRONT TUBE PLATE
12 CONTINUOUS THREADS PER INCH.
7 FT 10"
BACK TUBE PLATE
STAY TUBE
1/4" THICK.
ORDINARY TUBE
#10 B.W.G.
2 3/4" DIA.
2 1/2" DIA.
2 5/8" DIA.
3 3/4
4-THDS PER INCH
CALK
42
40
3 5/16" DIA.
3 3/4" DIA.
6 1/2" DIA.
23"
18"
2 FT 8"
12"
16"
1 3/16 RIVETS
1 7/16 HOLES
3 FT 8" ON SHELL.
1 1/4" RIVETS 1 5/16" HOLES
ABT 3 3/4" PITCH.
1 3/8 RIVETS 1 7/16" HOLES.
1 1/4" RIVETS 1 5/16" HOLES
ABT 3 3/4" PITCH
OUTSIDE BUTTSTRAP 1 1/8"
INSIDE BUTTSTRAP 1 3/16"
11 FT 0 11/16"
3 FT 3"
℄ 12"×16" M.H.
STEEL NET AREA 6.49□"
12 FT 5 3/16" OVER STAYS FOR CONT 12491 & FUTURE CONT.
12 FT 5 15/16" OVER STAYS. FOR CONT 12419 & 12492
6 FT 9"
2 FT 6"
2 FT 7 3/16"
STEEL
FOR CONT 12419-12492
FOR CONT 12491 & FUTURE CONT.
4 THREADS PER INCH.
39 DIE 2027-99 1/2" THICK. 1 13/16 DIA. HOLE.
38 1" RIVETS WITH THIMBLES 1 1/16" HOLES.
3 FT 1 5/8"
FOR 12419-12492
FOR 12491 & FUTURE CONT.
TUBES 2 1/2" O.D. WROT IRON, LAP WELDED.
FUSIBLE PLUG.
7 FT 10" BET. PLATES.
3 FT 0" BET. PLATES
15 FT 1 3/4" INSIDE DIAM.
3 FT 2 13/16
2 FT 9 13/32"
ABT 8 FT 8" OVER STAY.
1 3/4" W.I. STAYS
12 FULL-V-THREADS PER INCH.
37/64" THICK FOR THIS LENGTH.
7 FT 7 3/4" OVER FURNACE
GRATE 5 FT 9" LONG.
3 FT 7 3/4" INSIDE DIA.
3 FT 9 1/8" OUTSIDE DIA.
12 FT 5 5/8"
11 FT 9" OVER BOTTOM HEADS.
43
44
41
45
46
47
49
50
28
29
FOR 12491 & 12492
FOR 12419
7 FT 0" RAD.
9 FT 2 OF SHELL
150 ORDINARY TUBES
FUSIBLE PLUG
THESE ROWS OF STAYS RIVETED OVER AS SHOWN
11×15
6-7/8" RIVETS ON 5 3/4" P.C.
LOCATION OF PADS FOR TIE RODS FOR CONT 12491 & 12492 ONLY
℄ BUTT
FURNACE
TUBE SHEET
FIRE SIDE
WATER SIDE
WRAPPER
BACK SHEET
HEAD
BOTTOM HEAD
1 1/4" SCREW STAYS
1 3/4" SC. STAYS
8 15/16"

BUREAU OF COMMERCE

$$\text{PLATE }\% = \frac{8.9375-1.4375}{8.9375}\times100 = 83.9\%$$

$$\text{RIVET }\% = \frac{5\times1.623\times1.75\times.85}{8.9375\times1.3125}\times100 = 102\%$$

LLOYDS RULE

$$\text{PLATE }\% = 83.9\%$$

$$\text{RIVET }\% = \frac{5\times1.484\times1.75\times85}{8.9375\times1.3125} = 94\%$$

ALTERATIONS	DATE	APP'D.
DEPTH OF WRAPPER SCREW STAY NUTS CHANGED FROM 1" TO 1 1/4"	27-JE-17	P.M.Y.

CONSTRUCTED UNDER THE RULES OF THE BOARD OF SUPERVISING INSPECTORS, DEP'T OF COMMERCE & LLOYD'S REGISTER

180 LBS WORKING PRESSURE

DESCRIPTION	THICKNESS	U.S. RULES	LLOYDS RULES
SHELL	1 5/16	$P=\frac{63000\times1.3125}{6\times90.875}+20\% = 181^{\#}$	$P=\frac{22(21-2)83.9}{183.062} = 191^{\#}$
FURNACE	17/32	$P=\frac{15600\times.531}{42.875} = 193^{\#}$	$P=\frac{1259\times(8.5-2)}{44.937} = 182^{\#}$
TOP HEAD PLATE	1 3/16	$P=\frac{175\times19^2}{18^2} = 194^{\#}$	$P=\frac{175\times19^2}{290} = 217^{\#}$
TOP HEAD STAYS	2 7/8	$S=\frac{180\times18\times16}{6.49} = 7987^{\#}$	$P=\frac{10400\times6.49}{18\times16} = 234^{\#}$
TUBE PLATE	13/16	$P=\frac{(3.75-2.232).8125\times27000}{37.531\times3.75} = 236^{\#}$	$P=\frac{(3.75\times2.232)1750\times13}{36\times3.75} = 255^{\#}$
C.C. CROWN PLATE	23/32	$P=\frac{135\times11.5^2}{8.75^2} = 233^{\#}$	$P=\frac{135\times11.5^2}{66.406} = 268^{\#}$
C.C. CROWN STAYS.	1 3/4	$S=\frac{180\times8.75\times7.5}{1.997} = 5915^{\#}$	$P=\frac{7500\times1.997}{8.75\times7.5} = 228^{\#}$
C.C. WRAPPER PLATE	23/32	$P=\frac{135\times11.5^2}{8.625^2} = 240^{\#}$	$P=\frac{135\times11.5^2}{65.32} = 273^{\#}$
C.C. WRAPPER STAYS	1 3/4	$S=\frac{180\times8.625\times7.5}{1.997} = 5830^{\#}$	$P=\frac{7500\times1.997}{8.625\times7.5} = 231^{\#}$
C.C. BACK PLATE	23/32	$P=\frac{135\times11.5^2}{8.5^2} = 247^{\#}$	$P=\frac{135\times11.5^2}{66.15} = 269^{\#}$
C.C. BACK STAYS	1 3/4	$S=\frac{180\times8.5\times7.75}{1.997} = 5937^{\#}$	$P=\frac{7500\times1.997}{8.5\times7.75} = 227^{\#}$
CROWN GIRDERS	9 1/2 × 1	$P=\frac{917\times9.5^2\times2}{(37.531-7.5)8.75\times3.127} = 201^{\#}$	$P=\frac{11850\times9.5^2\times2}{(36-7.5)8.75\times36} = 238^{\#}$
WIDE WATER SPACE FRONT HEAD.			$P=\frac{140\times16^2}{13.4375^2} = 198$

ALTERATIONS	DATE	APP'D.
NO OF PLATES IN SHELL CHANGED FROM TWO TO THREE.	10 MARCH 16	P.M.Y.
DRILLING FOR LOWER BUTT FOR 4 BOILERS ALTD AS SHOWN	6 MAY 16	P.M.Y.
LOCATION OF MANHOLE SHOWN	6 JULY-16	P.M.Y.

BOILER DATA.	ONE BOILER HEATING SURFACE
TUBES.	2501 □'
FURNACES	152 □'
COMB CHAMB	248 □'
BACK TUBE PLATE	53 □'
TOTAL	2954 □'
GRATE SURFACE	58.75 □'
H.S./G.S.	50.2
CALORIMETER	12.45 □'
G.S./GAL.	4.71

ALTERATIONS	DATE	APP'D.
PADS FOR TIE RODS FOR CONTS 12491-12492 SHOWN	15 NOV-16	
DETAIL OF TOP HEAD STAY NUT FOR CONT 12491 SHOWN, CAP NUTS ALTERED AS PER DETAIL & WASHERS FOR TOP HEAD STAYS OMITTED FOR CONT 12491	7-MCH-17	P.M.Y.

FOR CONT 12491 SEE B/M 12491-561-1 TO 13 INCL.
" " 12492 SEE B/M 12492-561-1 TO 13 " P.M.Y.

TENSILE STRENGTH OF SHELL PLATES & GIRDERS 63000 TO 71680 LBS.
" " " FLANGE " 58240 TO 67200 LBS.
WORKING PRESSURE 180 LBS PER SQ. INCH.
WATER TEST " 270 " " " "
EVAPORATION 270 LBS. OF WATER PER SQ. FT. OF GRATE PER HOUR.
TWIN SAFETY VALVE 3 1/2" DIA. 5" INLET 5" OUTLET.

FOR DETAIL OF PADS FOR CONT 12491 SEE SK 12491-570-01 & B/M 12491-570-1
" " " " " " 12492 " " 12491-570-01 & B/M 12492-570-1

4-BOILERS AS DRAWN } FOR 2 SHIPS
2 " TO OTHER HAND

DETAIL OF CAP NUT FOR 2 7/8" DIAM. STAY.

THIS SPACE TO BE PACKED WITH MANGANISITE

DETAIL OF TOP HEAD STAY WASHERS FOR CONT 12419 & 12492 ONLY

360 ORDINARY TUBES 2 1/2" O.D. #10 B.W.G.
128 STAY TUBES 2 1/2" O.D. 1/4" THICK
488 TOTAL

1-LOWER BUTT ON 4 BOILERS OF CONT 12419 DRILLED THUS, DUE TO MISS DRILLING FOR SCREW STAYS.

DETAIL FOR TWO LOWER BUTTS.

HOLES IN FRONT BOTTOM HEAD BORED OUT TO SUIT FURNACES.

7/8" RIVETS 15/16" HOLES 2 1/8" PITCH.

ALL CALKING EDGES OF BOILER PLATE TO BE MACHINE PLANED, SEAMS, BUTTS AND LAPS TO FIT CLOSELY DRAWN UP METAL TO METAL AND AFTER BEING RIVETED CALKED INSIDE & OUTSIDE

ALL SCREW STAYS W.I.
SCREW STAYS ON BACK HEAD MARKED THUS
◎ 2" DIA NUTS 1 1/4" DEEP. WASHERS INSIDE & OUT
NET AREA 2.677□"
SCREW STAYS ON BACK HEAD MARKED THUS
○ 1 3/4" DIA NUTS 1 1/4" DEEP. WASHERS INSIDE & OUT.
NET AREA 1.997□"
WRAPPER SCREW STAYS 1 3/4" DIA NUTS 1 1/4" DEEP WITH WASHERS, RIVETED OVER IN SHELL
GIRDER SCREW STAYS 1 3/4" DIA. NUTS 1 1/4" & 1 3/4" DEEP
ALL SCREW STAYS HAVE 12 FULL-V-THREADS PER INCH.
ALL SCREW STAYS TO HAVE 3/16" HOLE DRILLED 1/2" BEYOND INNER SURFACE OF PLATE.

For 12491 161-162 Mail 2
For 12492 163-164 Mail 2
28-7-17

Cont 12419
68-72 Lloyds 5
73-75 Insp 3
Cont 12491
76-78 Lloyds 3
79-80 Insp 2
Cont 12492
81-84 Lloyds 4
85-86 Insp 2
10-MR-16

FOR CONTRACT 12492

ENGINE DEPARTMENT
TITLE S.E SCOTCH BOILER
15 FT 1 3/4" INSIDE DIA. × 11 FT 9" OVER BOTT. HEADS
180 LBS WORKING PRESS.
SCALE 1"-3'-6" = 1 FT DRAWN BY 223 DATE
TRACED BY 223 CHECKED BY CHIEF DRAFTSMAN
NEW YORK SHIP BUILDING CO.
CAMDEN, NEW JERSEY, U.S.A.
DR 12419-561-1
APPROVED BY CHIEF ENGINEER.

W409-0192

Copy of Approved Plan

Sun Shipbuilding Co
Chester. Pa.

3 S.E. Scotch Boilers for.
Hull No 1
"Elwood."
ex
SS "Chester Sun".

Phl 2720.

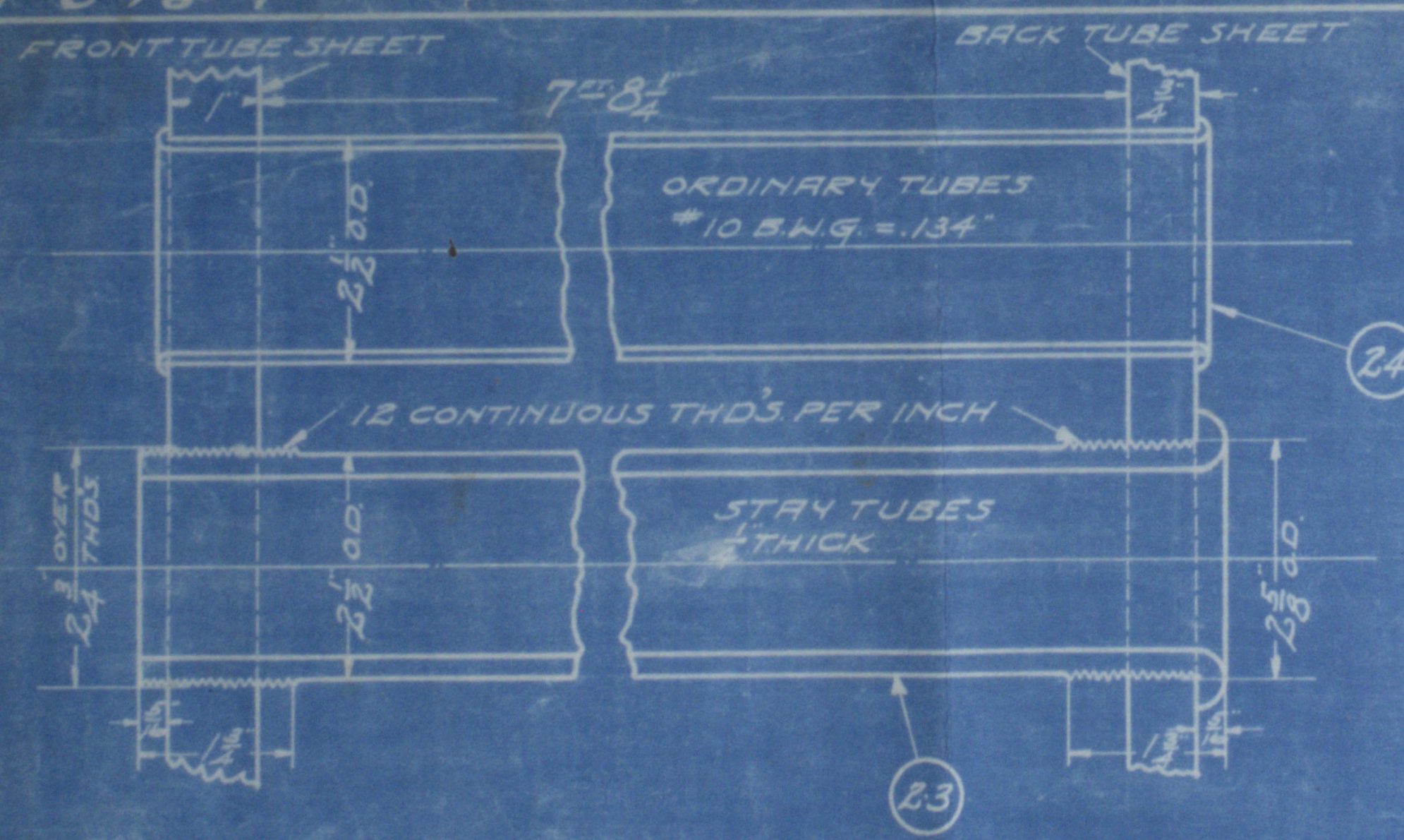
No 150
LLOYDS TEST
285 LBS
20-10-17. JD

J Davey

RETAIN

W409 — 0190

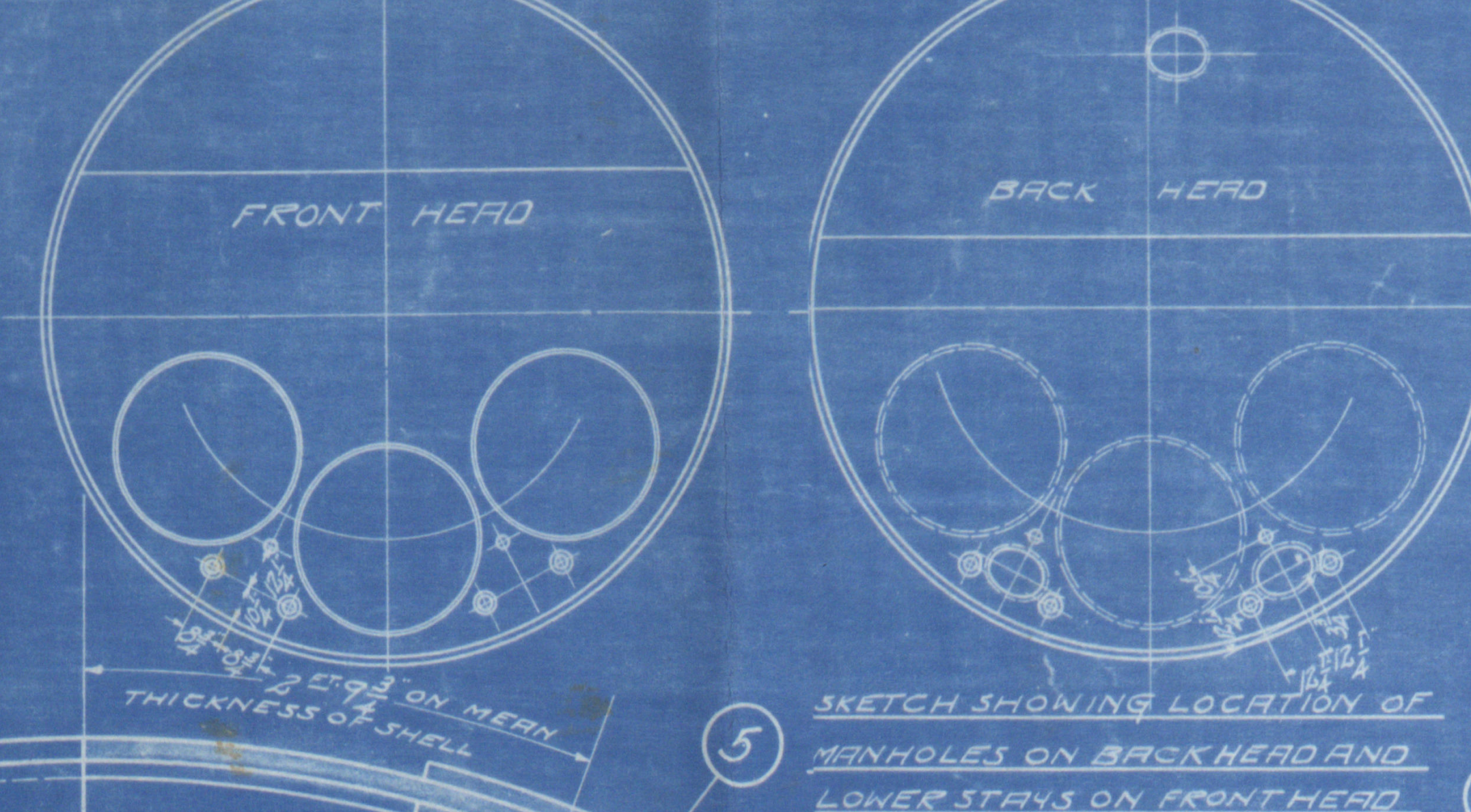
1-862-1


FRONT TUBE SHEET
BACK TUBE SHEET
7 FT 8¼"
1"
¾"
ORDINARY TUBES #10 B.W.G. = .134"
2½" O.D.
12 CONTINUOUS THD'S. PER INCH
STAY TUBES ¼" THICK
2¾" OVER THD'S
2⅝" O.D.
24
23

BUREAU OF COMMERCE & LLOYD'S RULES

$$\text{PLATE \%}\ \frac{8.687-1.437}{8.687}\times 100 = 83.4\%$$

$$\text{RIVET}\ \frac{5\times 1.623\times 1.75\times 85}{8.687\times 1.468}\times 100 = 94.6\%$$


FRONT HEAD
BACK HEAD

SKETCH SHOWING LOCATION OF MANHOLES ON BACK HEAD AND LOWER STAYS ON FRONT HEAD FOR CONT. 3&4 - 7&8

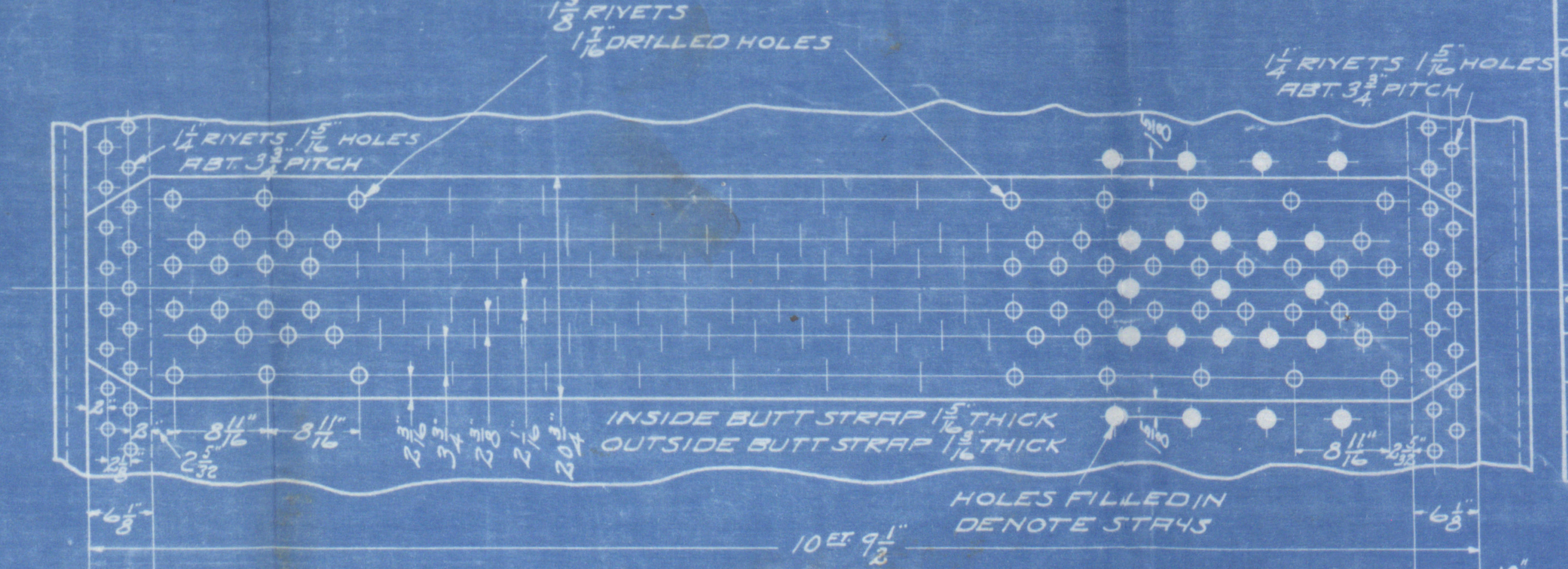
ALTERATIONS	DATE	APRVD
WATER SPACE IN BACK INCREASED ¾ INCH.	25 S 16	A.A.H.
MANHOLES IN BOTTOM HEAD MADE 12×16 & STAY OVER MANHOLES CHANGED TO SUIT.	19 O 16	A.A.H.
NOTE REGARDING RIVETING OF SCREW STAYS ON BOTH ENDS ADDED	19 D 16	A.A.H.
12×16 MANHOLE LOCATED ON BOILER SHELL	8 Mr 17	A.A.H.
12"×16" SHELL MANHOLE CHANGED TO BACK TOP HEAD	18 Ap 17	A.A.H.
SKETCH LOCATING MANHOLES FOR CONT. 3&4 - 7&8 ADDED	18 Ap 17	A.A.H.

CONSTRUCTED UNDER THE BOARD OF SUPERVISING INSPECTORS, DEP'T. OF COMMERCE & LLOYD'S RULES FOR 190 LBS. WORKING PRESSURE

DESCRIPTION	THICKNESS	U.S. RULES	LLOYD'S RULES
SHELL	1 15/32	$P=\frac{60{,}000\times 1.468}{6\times 91.5}+20\%=192.5\#$	$P=\frac{21.045(23.5-2)83.4}{184.468}=204\#$
FURNACE	5/8	$P=\frac{15600\times .625}{47}=207\#$	$P=\frac{1259\times(10-2)}{49.25}=204\#$
TOP HEAD PLATE	1 1/8"	$P=\frac{175\times 18^2}{17.25^2}=190.5\#$	$P=\frac{175\times 18^2}{289.0625}=196\#$
TOP HEAD STAY	2 3/4"	$S=\frac{16.75\times 15.5\times 190}{5.939}=8306\#$	$P=\frac{10400\times 5.93}{16.75\times 15.5}=237\#$
TUBE PLATE	3/4"	$P=\frac{(3.75-2.23)\times .75\times 27000}{36.5\times 3.75}=224\#$	$P=\frac{(3.75-2.23)\times 1750\times 12}{35\times 3.75}=243\#$
C.C. CROWN PLATE	5/8"	$P=\frac{135\times 10^2}{7.75^2}=225\#$	$P=\frac{135\times 10^2}{55.41}=243\#$
C.C. CROWN STAYS	1 5/8	$S=\frac{7.75\times 7.125\times 190}{1.694}=6193\#$	$P=\frac{7500\times 1.694}{7.75\times 7.125}=230\#$
WRAPPER PLATE	5/8"	$P=\frac{135\times 10^2}{7.375^2}=248\#$	$P=\frac{135\times 10^2}{52.57}=257\#$
WRAPPER STAYS	1 5/8	$S=\frac{7.375\times 7.125\times 190}{1.694}=5893\#$	$P=\frac{7500\times 1.694}{7.375\times 7.125}=241\#$
C.C. BACK PLATE	5/8"	$P=\frac{135\times 10^2}{7.5^2}=240\#$	$P=\frac{135\times 10^2}{53.95}=250\#$
C.C. BACK STAYS	1 5/8	$S=\frac{7.5\times 7.187\times 190}{1.694}=6045\#$	$P=\frac{7500\times 1.694}{7.5\times 7.187}=236\#$
CROWN GIRDERS	9¼ × 7/8"	$P=\frac{917\times 9.25^2\times 1.75}{(3.65-7.125)\times 7.75\times 3}=202\#$	$P=\frac{11850\times 9.25^2\times 1.75}{(35-7.125)\times 7.75\times 35}=237\#$
WIDE WATER SPACE	1"		$P=\frac{140\times 16^2}{13^2}=212$
BOTT. C.C.	15/16"	$P=\frac{50[(300\times .937)-(2\times 36.5)]}{51.375}=203\#$	$P=\frac{50\times(300\times .937-35)}{51.375}=239$

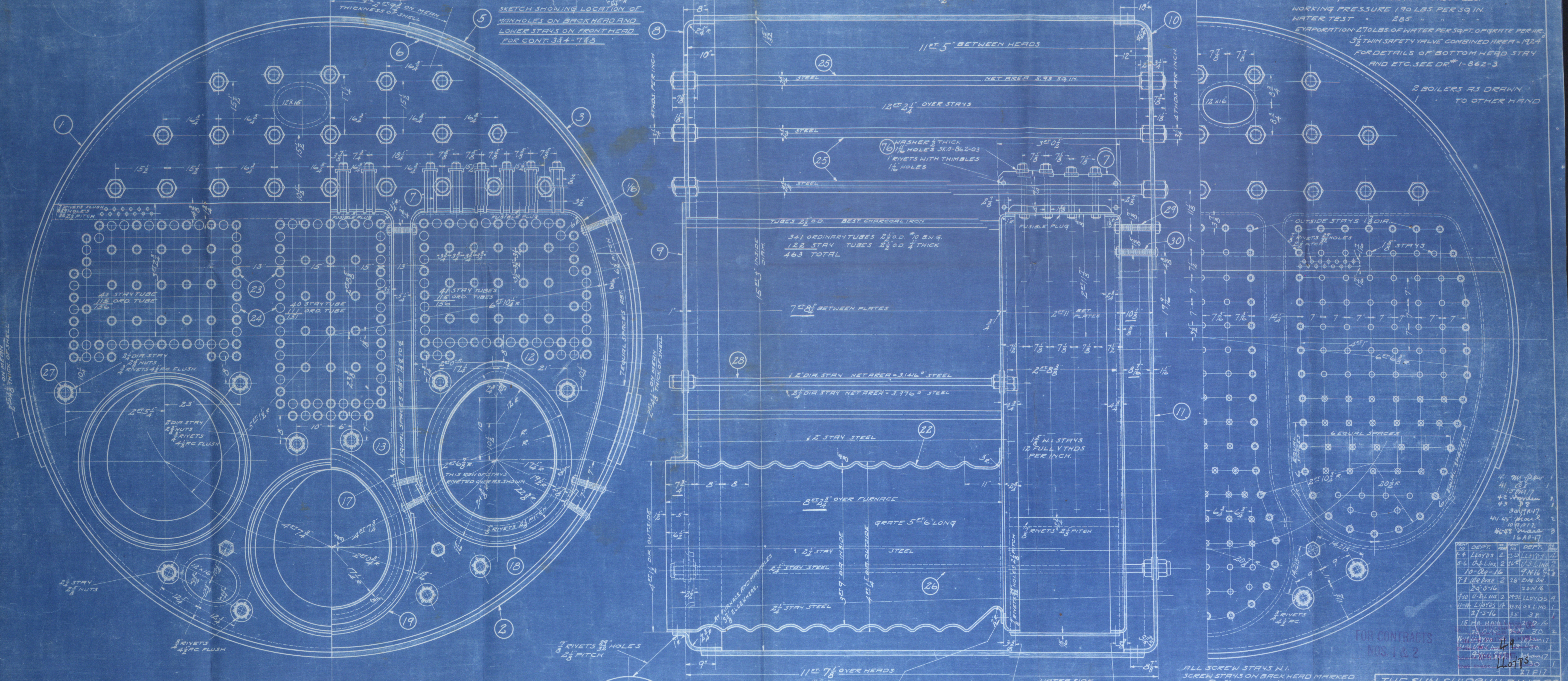
ALTERATIONS	DATE	APVD.
DRAWING NO. CHANGED FROM 1-852-1 TO 1-862-1	14 Aug 16	A.A.H.
SHELL PLATE WIDTH CHANGED FROM 131¼" TO 129½" - RADII AT HEADS AND PITCH OF BUTT RIVETS CHANGED TO SUIT.	18 Se 16	A.A.H.

BOILER DATA	ONE BOILER HEAT. SURFACE
TUBES	2329.5 □'
FURNACES	164 □'
COMB. CHAMBER	231.4 □'
BACK TUBE PLATE	52.2 □'
TOTAL H.S.	2777 □'
GRATE SURFACE	61.8 □'
H.S./G.S.	44.9
CALORIMETER	11.9 □'
G.S./CAL.	5.2


1⅜" RIVETS 1 7/16" DRILLED HOLES
1¼" RIVETS 1 5/16" HOLES ABT. 3¾" PITCH
INSIDE BUTT STRAP 1 5/16" THICK
OUTSIDE BUTT STRAP 1 3/16" THICK
HOLES FILLED IN DENOTE STAYS
8 11/16"
2 5/32"
20¾"
6⅛"
10 FT 9½"

TENSILE STRENGTH OF SHELL PLATES & GIRDERS 60,000 TO 70,000 LBS.
" " " FLANGE " 58240 TO 67200 LBS.
WORKING PRESSURE 190 LBS. PER SQ. IN.
WATER TEST " 285 " " " "
EVAPORATION 270 LBS. OF WATER PER SQ. FT. OF GRATE PER HR.
3½" TWIN SAFETY VALVE COMBINED AREA = 19.24□"
FOR DETAILS OF BOTTOM HEAD STAY AND ETC. SEE DR. # 1-862-3

2 BOILERS AS DRAWN
1 " TO OTHER HAND


11 FT 5" BETWEEN HEADS
NET AREA 5.93 SQ. IN.
12 FT 2¼" OVER STAYS
STEEL
76 WASHER ½" THICK 1 1/16" HOLES SK.0-862-03
1" RIVETS WITH THIMBLES 1 1/16" HOLES
TUBES 2½" O.D. BEST CHARCOAL IRON
341 ORDINARY TUBES 2½" O.D. #10 B.W.G.
122 STAY TUBES 2½" O.D. ¼" THICK
463 TOTAL
15 FT 3" INSIDE DIAM.
7 FT 8¼" BETWEEN PLATES
FUSIBLE PLUG
1 2" DIA. STAY NET AREA = 3.1416□" STEEL
12" STAY STEEL
1⅝" W.I. STAYS 12 FULL V THDS PER INCH
8 FT 2½" OVER FURNACE
GRATE 5 FT 6" LONG
1⅛" RIVETS 2⅞" PITCH
12×16
OUTSIDE STAYS 1⅝" DIA.
EQUAL SPACES
1
2
3
5
6
7
8
9
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11
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29
30

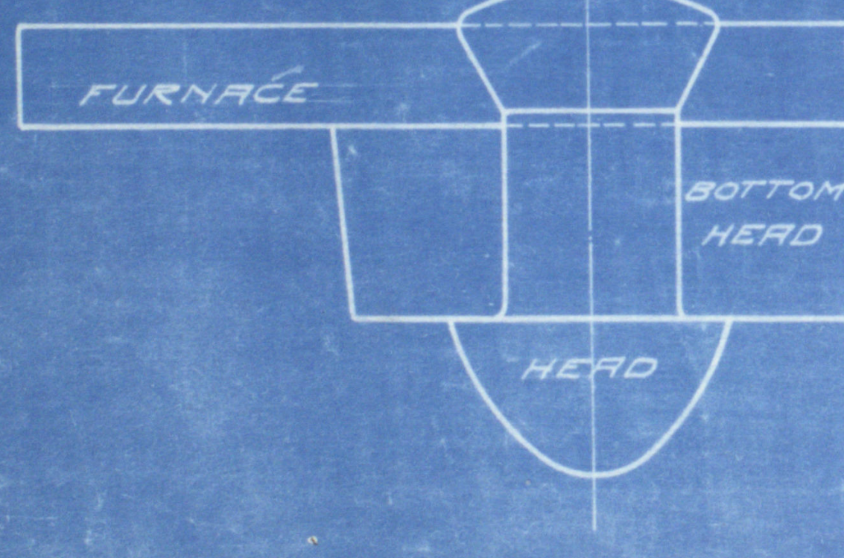
PRINT NO.	DEPT.	NO. PRINT	PRINT NO.	DEPT.	NO. PRINT
1-4	LLOYDS	4	13-15	LLOYDS	4
5-6	U.S.L.INS.	2	16-17	U.S.L.INS.	2
	10-Ag-16			9-N-16	FOR 7&8
7-8	MR DUKE	2	28	ENG. DR.	
	25-5-16			23 N 16	
9-10	U.S.L.INS.	2	29-32	LLOYDS	4
11-14	LLOYDS	4	33-34	U.S.L.INS.	1
	27-5-16		35	38	1
15	MR. HAIG	1		20 D-16	
	30-0-16		36-37	30	2
16-19	LLOYDS	4		16 Jan 17	
20-21	U.S.L.INS.		38	30	1
	9-N-16 FOR 7&8			30 Jan 17	
			39	30	1
				27 F 17	

40 Mr. Pew 1
41 38 1
15 MR 17
42 Warden 1
43 38 1
30 MR 17
44-45 Moul 2
10 AP 17
46-48 Maie 3
16 AP 17

46-48 Maie 3
49-54 Lloyds 6
55-58 [illegible]
59-60 30 2
61 38 1
19 AP 17

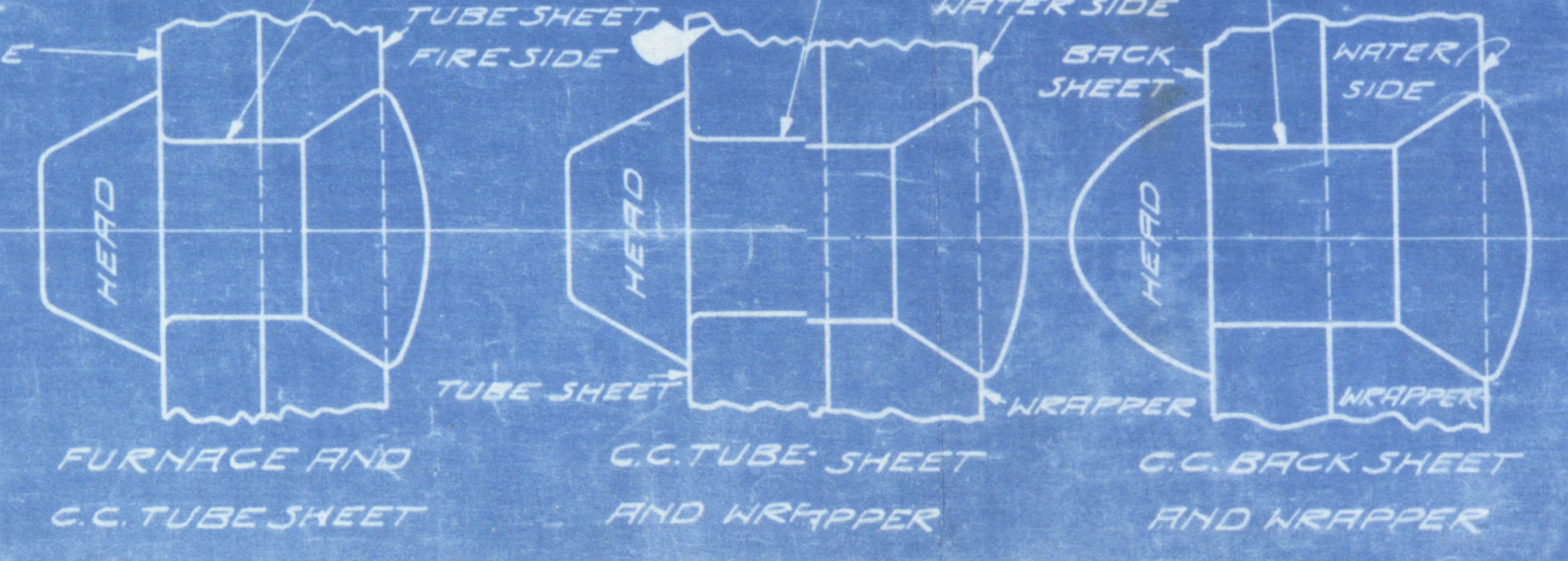
FOR CONTRACTS NOS. 1 & 2

SUN SHIPBUILDING CO. CHESTER PA. BLUEPRINT ROOM
Print No. 49
Made APR 19 1917
For Dept. Lloyds


FURNACE
BOTTOM HEAD
HEAD
7/8" RIVETS 15/16" HOLES 2¾" PITCH
1" R.
2¾" R.
9"

11 FT 7⅛" OVER HEADS

NOTE:-
ALL CALKING EDGES OF BOILER PLATE TO BE TO BE MACHINE PLANED. SEAMS, BUTTS AND LAPS TO FIT CLOSELY DRAWN UP METAL TO METAL, & AFTER BEING RIVETED, CALKED INSIDE AND OUTSIDE.
ALL REINFORCE PLATES TO BE CALKED.


FURNACE
TUBE SHEET FIRE SIDE
HEAD
TUBE SHEET
WATER SIDE
BACK SHEET
WATER SIDE
WRAPPER

FURNACE AND C.C. TUBE SHEET

C.C. TUBE SHEET AND WRAPPER

C.C. BACK SHEET AND WRAPPER

ALL SCREW STAYS W.I.
SCREW STAYS ON BACK HEAD MARKED THUS ◎ 1⅞" DIA. NUTS 1¼" DEEP NET AREA 2.324□"
SCREW STAYS ON BACK HEAD MARKED THUS ○ 1⅝" DIA. NUTS 1" DEEP IN C.C. NO NUTS ON BACK HEAD NET AREA 1.694□"
WRAPPER SCREW STAYS 1⅝" DIA. NUTS 1" DEEP
GIRDER SCREW STAYS 1⅝" DIA. NUTS 1⅝ & 1" DEEP
ALL SCREW STAYS HAVE 12 FULL V THREADS PER INCH.
ALL SCREW STAYS TO HAVE 3/16" HOLE DRILLED ½" BEYOND INNER SURFACE OF PLATE.
SCREW STAYS ON BACK HEAD MARKED THUS ⊗ ARE RIVETED OVER ON BOTH ENDS.

THE SUN SHIPBUILDING CO.
CHESTER PA.
ENGINEERING DEP'T.

15 FT 3" INSIDE DIA. 11 FT 5" BTW. HEADS
S.E. SCOTCH BOILER
190 LBS. WORKING PRESSURE

SCALE 1" = 1 FOOT
DATE
DR. BY
APPROVED Robert Haig
TR. BY K.P.A.
CHK'D BY A.A.H.

DR. NO. 1-862-1

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W409-0190

Boiler

R. Wetherill & Co

for

Sun Shg Co 1-2

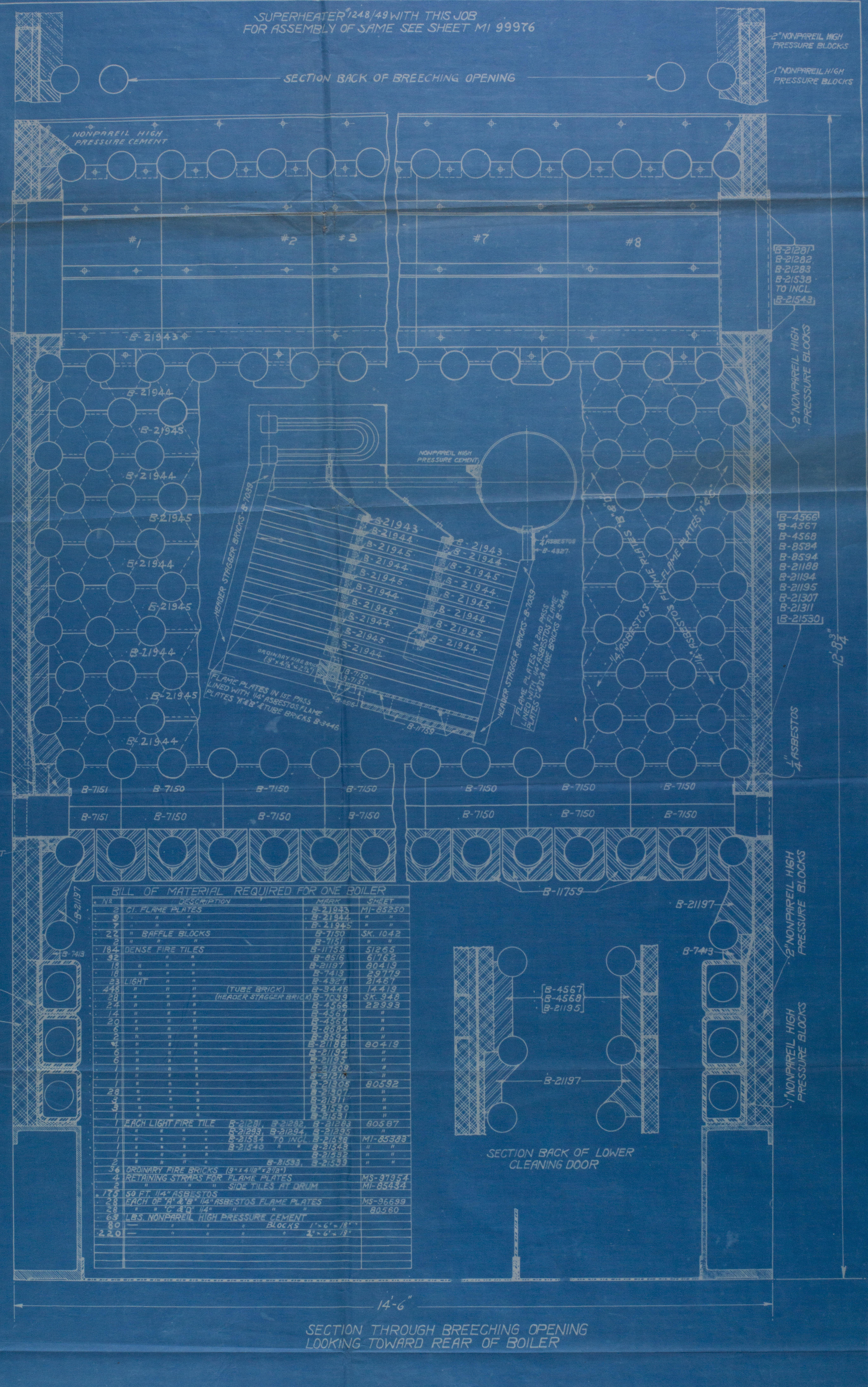
"Elwood."

Phl rept No. 2720

RETAIN

W409-0191

Chester Sun


SUPERHEATER #1248/49 WITH THIS JOB
FOR ASSEMBLY OF SAME SEE SHEET MI 99976
SECTION BACK OF BREECHING OPENING
2" NONPAREIL HIGH PRESSURE BLOCKS
1" NONPAREIL HIGH PRESSURE BLOCKS
NONPAREIL HIGH PRESSURE CEMENT
#1
#2
#3
#7
#8
B-21293
B-21294
B-21295
B-21532
TO INCL.
B-21537
B-21281
B-21282
B-21283
B-21538
TO INCL.
B-21543
B-21943
B-21944
B-21945
B-4566
B-4567
B-4568
B-8584
B-8594
B-21188
B-21194
B-21195
B-21305
B-21307
B-21209
B-21210
B-21311
B-21530
B-21531
1/4" ASBESTOS
HEADER STAGGER BRICKS-B-7039
NONPAREIL HIGH PRESSURE CEMENT
1/4" ASBESTOS
B-4327
ORDINARY FIRE BRICKS (9"×4 1/2"×2 1/2")
FLAME PLATES IN 1ST. PASS LINED WITH 1/4" ASBESTOS FLAME PLATES "A" & "B" & TUBE BRICKS B-3446
FLAME PLATES IN 2ND PASS LINED WITH 1/4" ASBESTOS FLAME PLATES "C" & "D" & TUBE BRICKS B-3446
1/4" ASBESTOS FLAME PLATES "A" & "B"
1/4" ASBESTOS FLAME PLATES "C" & "D"
B-7150
B-7151
B-8516
B-11759
B-21197
B-7413
B-21195
12'-8 3/4"
14'-6"
SECTION BACK OF LOWER CLEANING DOOR

SECTION THROUGH BREECHING OPENING
LOOKING TOWARD REAR OF BOILER

BILL OF MATERIAL REQUIRED FOR ONE BOILER

NO	DESCRIPTION	MARK	SHEET
2	C.I. FLAME PLATES	B-21943	MI-85250
9	" "	B-21944	" "
7	" "	B-21945	" "
22	" BAFFLE BLOCKS	B-7150	SK. 1042
2	" " "	B-7151	" "
184	DENSE FIRE TILES	B-11759	51265
32	" "	B-8516	61762
18	" " "	B-21197	80419
18	" " "	B-7413	29779
23	LIGHT " "	B-4327	21467
448	" " " (TUBE BRICK)	B-3446	14419
28	" " " (HEADER STAGGER BRICK)	B-7039	SK. 948
24	" " "	B-4566	22993
14	" " "	B-4567	"
20	" " "	B-4568	"
6	" " "	B-8584	"
2	" " "	B-8594	"
4	" " "	B-21188	80419
6	" " "	B-21194	"
6	" " "	B-21195	"
1	" " "	B-21209	"
1	" " "	B-21210	"
1	" " "	B-21305	80592
28	" " "	B-21307	"
3	" " "	B-21311	"
3	" " "	B-21530	"
1	" " "	B-21531	"
1	EACH LIGHT FIRE TILE B-21281, B-21282,	B-21283	80587
1	" " " " B-21293, B-21294,	B-21295	"
1	" " " " B-21534 TO INCL.	B-21538	MI-85383
1	" " " " B-21540 " "	B-21543	" "
1	" " " "	B-21532	" "
2	" " " " B-21533,	B-21539	" "
36	ORDINARY FIRE BRICKS (9"×4 1/2"×2 1/2")		
4	RETAINING STRAPS FOR FLAME PLATES		MS-37954
2	" " " SIDE TILES AT DRUM		MI-85434
175	50 FT. 1/4" ASBESTOS		
28	EACH OF "A" & "B" 1/4" ASBESTOS FLAME PLATES		MS-96699
28	" " "C" & "D" 1/4" " " "		80560
63	LBS. NONPAREIL HIGH PRESSURE CEMENT		
80	— " " " BLOCKS 1"×6"×18"		
220	— " " " " 2"×6"×18"		

FOR ARRANGEMENT OF SIDE TILES
SEE SHEET MI-96680-

THE BABCOCK & WILCOX CO.
MARINE TYPE BOILER, PATENTED.
ARRANGEMENT OF BAFFLES & BRICKS
24 WIDE.

SCALE 1/2"-1 1/2"-1 FT.	DATE AUGUST. 3. 1916	
SHEET	CASE	JOB.
M.I. 101405-		M.B 333/334

PRINTED FOR FILE:

2.9.16

AUG 9 1916
NEW YORK

9.8.16

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NEW YORK

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